

Notice of Allowability

Application No.

09/535,857

Examiner

Jerome Grant II

Applicant(s)

DITTRICH ET AL

Art Unit

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS. This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to an interview summary conducted Dec. 17, 2004.
2. ☒ The allowed claim(s) is/are 1-40.
3. ☒ The drawings filed on 22 October 2002 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date 12-22-04
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____

Reasons for Allowance

Claims 1-12 are allowed for the reason the prior art does not teach or suggest in claimed combination, "... generating an output value.. and position information indicating the justification of the sub-pel region within the pel; and forming a look-up table from the generated output values that enhances print quality."

Claims 13-24 are allowed for the reason the prior art does not teach or suggest means for generating an output values... and position information indicating the justification of the sub-pel region within a pel and position information indicating the justification of the sub-pel region within the pel and means for forming a LUT from the generated output values that enhances print quality.

Claims 25-36 are allowed for the reason the prior art does not teach or suggest in claimed combination, "... generating an output value for different patterns of pel data... and position information indicating the justification of the sub-pel region within the pel and forming a LUT from the generated output values that enhances print quality."

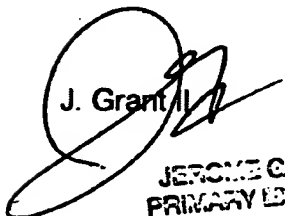
Art Unit: 2626

Claims 37-40 are allowed for the reason the prior art does not teach or suggest in claimed combination, "... position information indicating the justification of the sub-pel region within the pel."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerome Grant II whose telephone number is 703-305-4391. The examiner can normally be reached on Mon.-Fri. from 9:00 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kimberly A Williams, can be reached on 703-305-4863. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


J. Grant II
JEROME GRANT II
PRIMARY EXAMINER

Examiner's Amendment

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with David Victor on December 17, 2004.

1. (Original) A method for generating a table for enhancing the print quality of input raster pel data, comprising:

generating an output value for different patterns of pel data, wherein each output value indicates a sub-pulse width power to charge to a sub-pel region within a pel and position information indicating the justification of the sub-pel region within the pel; and

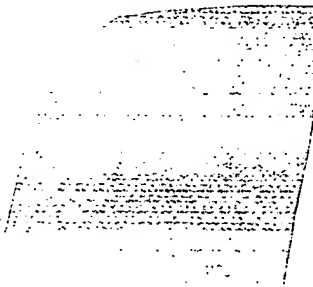
forming a look-up table from the generated output values that enhances print quality.

2. (Original) The method of claim 1, wherein toner is attracted to the charged sub-pel region.

3. (Original) The method of claim 1, wherein one output value is generated for a subject pel depending upon the pattern of pels surrounding the subject pel, wherein there is one output value for each possible pattern of surrounding pels.

4. (Original) The method of claim 3, wherein the subject pel is at the center of the surrounding pels, and wherein the surrounding pels form a diamond shape.

5. (Original) The method of claim 1, wherein the position information is used to cluster sub-pel regions next to each other in adjacent pels and justify an edge pel toward a black filled region adjacent to the edge pel.



6. (Original) The method of claim 1, wherein the output value for the sub-pulse width power is generated by adjusting a base sub-pulse width power by weights indicating the affect of a subject black pel on surrounding pels.

7. (Original) The method of claim 6, wherein the output value is generated for the subject black pel affecting the surrounding pels, wherein the surrounding pels comprise multiple regions of pels, wherein there is a separate weight for each region that is used to adjust the base sub-pulse width power of the subject black pel to produce the output value.

8. (Original) The method of claim 6, wherein, for each region, there is a black weight indicating the affect of the subject black pel on a black pel in the region and a white weight indicating the affect of the subject black pel on a white pel in the region, wherein adjusting the base sub-pulse width power for the subject black pel comprises, for each region:
adding the black weight to the sub-pulse width power for each black pel in the region;
and
subtracting the white weight from the sub-pulse width power for each white pel in the region.

9. (Original) The method of claim 7, wherein the for each region are calculated by solving an equation that uses the weights for each region to adjust an input array comprising the density at each greyscale level at the base sub-pulse width power to produce a target output array comprising desired density for each greyscale level.

10. (Original) The method of claim 9, wherein the adjustment of the input array using the weights is performed by adding a first function defining the density of the pels in the regions for each greyscale level after adjusting the subject black pel with the weights, subtracting a second function defining the density of the pels in the regions for each greyscale level with no

weight affect, adding a third function defining the density of the black subject pel for each greyscale level after adjusting the center pel with the weights, and subtracting a fourth function defining the density of the black subject pel with no weight affect.

11. (Original) The method of claim 10, wherein the four functions defining the affect of the black subject pel in each region are based on a greyscale level corresponding to a percentage of the subject black pel that affects the region measured at different power levels.

12. (Original) The method of claim 11, wherein the affect of the subject black pel in each region further comprises:

using the halftone algorithm to determine, for each region, black and white density arrays indicating a percentage of black and white pels, respectively, in the region for each greyscale level; and

for each region, multiplying the black and white density arrays and the results of the functions indicating the affect of the subject black pel on the region to determine the black and white density effects of the subject black pel on the region.

13. (Original) A system for generating a table for enhancing the print quality of input raster pel data, comprising:

means for generating an output value for different patterns of pel data, wherein each output value indicates a sub-pulse width power to charge to a sub-pel region within a pel and position information indicating the justification of the sub-pel region within the pel; and

means for forming a look-up table from the generated output values that enhances print quality.

14. (Original) The system of claim 13, wherein toner is attracted to the charged sub-pel region.

15. (Original) The system of claim 13, wherein one output value is generated for a subject pel depending upon the pattern of pels surrounding the subject pel, wherein there is one output value for each possible pattern of surrounding pels.

16. (Original) The system of claim 15, wherein the subject pel is at the center of the surrounding pels, and wherein the surrounding pels form a diamond shape.

17. (Original) The system of claim 13, wherein the position information is used to cluster sub-pel regions next to each other in adjacent pels and justify an edge pel toward a black filled region adjacent to the edge pel.

18. (Original) The system of claim 13, further comprising means for adjusting a base sub-pulse width power by weights indicating the affect of a subject black pel on surrounding pels to generate the output value for the sub-pulse width power.

19. (Original) The system of claim 18, wherein the output value is generated for the subject black pel affecting the surrounding pels, wherein the surrounding pels comprise multiple regions of pels, wherein there is a separate weight for each region that is used to adjust the base sub-pulse width power of the subject black pel to produce the output value.

20. (Original) The system of claim 18, wherein, for each region, there is a black weight indicating the affect of the subject black pel on a black pel in the region and a white weight indicating the affect of the subject black pel on a white pel in the region, wherein the means for adjusting the base sub-pulse width power for the subject black pel comprises, for each region:

means for adding the black weight to the sub-pulse width power for each black pel in the region; and

means for subtracting the white weight from the sub-pulse width power for each white pel in the region.

21. (Original) The system of claim 19, further comprising means for calculating the weights for each region by solving an equation that uses the weights for each region to adjust an input array comprising the density at each gray scale level at the base sub-pulse width power to produce a target output array comprising desired density for each gray scale level.

22. (Original) The system of claim 21, wherein adjustment of the input array using the weights is performed by adding a first function defining the density of the pels in the regions for each gray scale level after adjusting the subject black pel with the weights, subtracting a second function defining the density of the pels in the regions for each gray scale level with no weight affect, adding a third function defining the density of the black subject pel for each gray scale level after adjusting the center pel with the weights, and subtracting a fourth function defining the density of the black subject pel with no weight affect.

23. (Original) The system of claim 22, wherein the four functions defining the affect of the black subject pel in each region are based on a gray scale level corresponding to a percentage of the subject black pel that affects the region measured at different power levels.

24. (Original) The system of claim 23, wherein the affect of the subject black pel in each region is determined by:

means for using the halftone algorithm to determine, for each region, black and white density arrays indicating a percentage of black and white pels, respectively, in the region for each gray scale level; and

means for multiplying, for each region, the black and white density arrays and the results of the functions indicating the affect of the subject black pel on the region to determine the black and white density effects of the subject black pel on the region.

25. (Original) An article of manufacture for use in generating a table for enhancing the print quality of input raster pel data, the article of manufacture comprising at least one computer program capable of causing a processor to perform:

generating an output value for different patterns of pel data, wherein each output value indicates a sub-pulse width power to charge a sub-pel region within a pel and position information indicating the justification of the sub-pel region within the pel; and

forming a look-up table from the generated output values that enhances print quality.

26. (Original) The article of manufacture of claim 25, wherein toner is attracted to the charged sub-pel region.

27. (Original) The article of manufacture of claim 25, wherein one output value is generated for a subject pel depending upon the pattern of pels surrounding the subject pel, wherein there is one output value for each possible pattern of surrounding pels.

28. (Original) The article of manufacture of claim 27, wherein the subject pel is at the center of the surrounding pels, and wherein the surrounding pels form a diamond shape.

29. (Original) The article of manufacture of claim 25, wherein the position information is used to cluster sub-pel regions next to each other in adjacent pels and justify an edge pel toward a black filled region adjacent to the edge pel.

30. (Original) The article of manufacture of claim 25, wherein the output value for the sub-pulse width power is generated by adjusting a base sub-pulse width power by weights indicating the affect of a subject black pel on surrounding pels.

31. (Original) The article of manufacture of claim 30, wherein the output value is generated for the subject black pel affecting the surrounding pels, wherein the surrounding pels comprise multiple regions of pels, wherein there is a separate weight for each region that is used to adjust the base sub-pulse width power of the subject black pel to produce the output value.

32. (Original) The article of manufacture of claim 30, wherein, for each region, there is a black weight indicating the affect of the subject black pel on a black pel in the region and a white weight indicating the affect of the subject black pel on a white pel in the region, wherein adjusting the base sub-pulse width power for the subject black pel comprises, for each region:
 adding the black weight to the sub-pulse width power for each black pel in the region;
 and
 subtracting the white weight from the sub-pulse width power for each white pel in the region.

33. (Original) The article of manufacture of claim 31, wherein the weights for each region are calculated by solving an equation that uses the weights for each region to adjust an input array comprising the density at each gray scale level at the base sub-pulse width power to produce a target output array comprising desired density for each gray scale level.

34. (Original) The article of manufacture of claim 33, wherein the adjustment of the input array using the weights is performed by adding a first function defining the density of the pels in the regions for each gray scale level after adjusting the subject black pel with the weights, subtracting a second function defining the density of the pels in the regions for each gray scale

level with no weight affect, adding a third function defining the density of the black subject pel for each gray scale level after adjusting the center pel with the weights, and subtracting a fourth function defining the density of the black subject pel with no weight affect.

35. (Original) The article of manufacture of claim 34, wherein the four functions defining the affect of the black subject pel in each region are based on a gray scale level corresponding to a percentage of the subject black pel that affects the region measured at different power levels.

36. (Original) The article of manufacture of claim 35, wherein the affect of the subject black pel in each region further comprises:

using the halftone algorithm to determine, for each region, black and white density arrays indicating a percentage of black and white pels, respectively, in the region for each gray scale level; and

for each region, multiplying the black and white density arrays and the results of the functions indicating the affect of the subject black pel on the region to determine the black and white density effects of the subject black pel on the region.

37. (Original) A computer-readable transmission medium including at least one look-up table data structure used for enhancing the print quality of input raster pel data, comprising:

an output value for different patterns of pel data, wherein each output value includes:

- (i) a sub-pulse width power to charge to a sub-pel region within a pel, and
- (ii) position information indicating the justification of the sub-pel region within the pel.

38. (Original) The computer-readable transmission medium of claim 37, wherein the look-up table data structure one output value for a subject pel depending upon the pattern of pels surrounding the subject pel, wherein there is one output value for each possible pattern of surrounding pels.

39. (Currently Amended) The computer-readable transmission medium of claim 37, wherein the position information is used to cluster sub-pel regions next to each other in adjacent pels and justify an edge pel toward a black filled region adjacent to the edge pel.

40. (Currently Amended) The computer-readable transmission medium of claim 37, wherein the position information is used to cluster sub-pel regions next to each other in adjacent pels and justify an edge pel toward a black filled region adjacent to the edge pel.

Application/Control Number: 09/535,857

~~Page 3~~

Art Unit: 2626

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J. Grant II

JEROME GRANT II
PRIMARY EXAMINER